

REMARKS/ARGUMENTS

Claims 1-33 stand rejected in the outstanding Official Action. Claims 1-6, 9-12, 16-22, 24-26, 28-30, 32 and 33 have been amended and therefore claims 1-33 remain in this application.

The Examiner's acceptance of the originally filed drawings is appreciated. Additionally, the Examiner's consideration of the prior art submitted with Applicants' Information Disclosure Statement is appreciated.

The abstract is objected to as not being in single paragraph form. Applicants have amended the abstract so as to provide the original information in a single paragraph, thereby obviating any further objection thereto.

Claim 19 is objected to, as it inadvertently contained two periods. One of the periods has been deleted thereby obviating the objection.

Claims 1, 2, 5, 6, 8-15, 19, 20, 22-24, 26-28 and 30-32 stand rejected under 35 USC §102 as being anticipated by Sigalas. It is noted that all of Applicants' independent claims require that the cladding layer include a plurality of sub-regions as well and that the sub-regions in the cladding area are contiguous with the sub-regions in the core layer. The contiguous aspect of the sub-regions or holes in the cladding and the core layer can be seen in Figure 4 and is discussed on page 10, lines 2-4 of the specification as originally filed.

The Court of Appeals for the Federal Circuit has noted in the case of *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick*, 221 USPQ 481, 485 (Fed. Cir. 1984) that "[a]nticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim." Thus, in order to anticipate the applicant's independent claims the PTO must show where a single reference shows contiguous core

layer sub-regions (or holes) and cladding layer sub-regions (or holes). This has not been done in the official action.

The Examiner asserts that the embodiment shown in Figure 10g of Sigalas supports his conclusion that "since the sub-region in the cladding layer is composed of cladding layer material, its refractive index is the same as the cladding layer which is less than the refractive index of the core layer." This does not allege the contiguous nature of the sub-regions. Moreover, the Sigalas device is fabricated by etching away material in the core and the cladding layers to leave behind the sub-regions and then filling the etched spaces with a planarizing material such as polyimide. As a consequence, the material forming the core and the cladding layers, and therefore its refractive index, is the same. Clearly, the material forming the sub-regions in the core and the cladding layers is different. As a result, the Sigalas structure shown in Figure 10g does not disclose the subject matter recited in Applicants' independent claims.

Should the Examiner contend that Sigalas discloses the relationship between the core and cladding indices of refraction or the core sub-regions and core indices of refraction or that the cladding layer and the core layer have sub-regions which are contiguous, he is respectfully requested to point out those disclosures in the Sigalas or any other cited prior art reference. Absent such disclosure, any further rejection of claims 1, 2, 5, 6, 8-15, 19, 20, 22-24, 26-28 and 30-32 is respectfully traversed.

Claim 16 stands rejected under 35 USC §102 as being anticipated by Takada (U.S. Application Publication 2001/0033409). Independent claim 16 has been amended to recite the method steps of providing the cladding layer with a plurality of holes where the cladding layer holes are contiguous with the core layer holes. Takada contains no disclosure of any such

method and therefore the rejection is respectfully traversed. Should the Examiner contend that Takada teaches such method steps, he is respectfully requested to indicate the column and line number of such disclosure.

Claim 17 stands rejected under 35 USC §103 as obvious over Takada in view of Sigalas. Inasmuch as claim 17 depends from claim 16, it includes the limitations set out in claim 16 and therefore the above discussion distinguishing these limitations over both the Takada reference and the Sigalas reference is herein incorporated by reference. Because neither Takada nor Sigalas teach the subject matter of claim 17, it cannot be obvious in view thereof.

Claims 3, 4, 21, 25, 29 and 33 stand rejected under 35 USC §103 as unpatentable over Sigalas in view of Koops (U.S. Patent 6,075,915). Again, claims 3, 4, 21, 25, 29 and 33 ultimately depend from independent claims reciting the limitations of the plurality of holes or regions in the cladding layer which are contiguous with holes or sub-regions in the core layer. The Examiner does not allege that such structure previously noted to be missing from Sigalas is contained in the Koops reference. Therefore, since it is not disclosed in either Sigalas or Koops, it cannot be obvious in view of the combination and claims therefrom cannot be obvious. Therefore, any further rejection of claims 3, 4, 21, 25, 29 and 33 as being obvious over Sigalas/Koops is respectfully traversed.

Claim 18 stands rejected under 35 USC §103 as unpatentable over Takada in view of Koops. Again, claim 18 depends from claim 16 and, as noted above, neither Takada nor Koops teach the method step of providing the cladding layer and the plurality of holes in the cladding layer noted in claim 16, let alone the cladding area surrounding the core layer. Accordingly, claim 18 cannot be obvious in view of the Takada/Koops combination.

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Claim 7 stands rejected under 35 USC §103 as unpatentable over Sigalas in view of Cotteverte (U.S. Publication 2002/0048422). Claim 7 depends from claim 1 and therefore it is necessary that Sigalas or Cotteverte disclose the subject matter of Applicants' claimed plurality of sub-regions in the cladding area which are contiguous with the core layer sub-regions. As noted above, Sigalas clearly fails to contain such teaching and the Examiner has not identified any teaching in Cotteverte which contains that disclosure. Therefore, claim 7 is clearly patentable over the Sigalas/Cotteverte combination.

Having responded to all objections and rejections set forth in the outstanding Official Action, it is submitted that claims 1-33 are in condition for allowance and notice to that effect is respectfully solicited. In the event the Examiner is of the opinion that a brief telephone or personal interview will facilitate allowance of one or more of the above claims, he is respectfully requested to contact Applicants' undersigned representative.

Respectfully submitted,

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ABSTRACT

AN OPTICAL WAVEGUIDE STRUCTURE

A waveguide structure according to the invention comprises a core layer (10), having a refractive index n_{core} , and an array of rods (11) in the core layer having a refractive index n_{rods} . The refractive indices satisfy the inequality: $n_{rods} > n_{core}$. In a planar waveguide structure buffer (12) and cladding (13) layers are included, having a refractive index n_{buffer} and $n_{cladding}$ respectively. The refractive indices then satisfy the inequality: $n_{rods} > n_{core} > n_{cladding}$ and n_{buffer} . This condition provides greater vertical confinement of the E-field of an optical signal passing through the waveguide. Furthermore, it allows waveguides to be formed of a glassy material having a similar refractive index and core dimensions to that of a fibre. A high refractive index contrast within the photonic crystal region is used while totally eliminating the need for mode conversion to launch light in and out of the waveguide.

| (Figure 2)